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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte HIROYUKI IKEDA*

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Appeal 2008-5317  
Application 09/821,636  
Technology Center 2800

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Decided: December 22, 2008

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Before JOSEPH F. RUGGIERO, MAHSHID D. SAADAT,  
and MARC S. HOFF, *Administrative Patent Judges*.

SAADAT, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 1-3 and 39-41, which are all of the claims pending in this application as claims 4-38 have been canceled. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

## STATEMENT OF THE CASE

Appellant's invention relates to a thin film transistor display and a method for controlling the threshold voltage of the thin film transistors (Spec. 7-12).

Independent Claim 1 is representative and reads as follows:

1. A display apparatus comprising:

a plurality of thin film transistors, each of said thin film transistor comprising a semiconductor thin film constituting a channel and having a threshold voltage, and a first gate electrode on one side of said semiconductor thin film and a second gate electrode on an opposite side of said semiconductor thin film,

and further comprising a means for adjusting the threshold voltage by applying a first threshold adjustment voltage to the second gate electrode when the first gate electrode receives a first control voltage and applying a second threshold adjustment voltage different than the first threshold adjustment voltage to the second gate electrode when the first electrode receives a second control voltage.

The Examiner relies on the following prior art in rejecting the claims:

Kubota US 5,808,595 Sep. 15, 1998

Claims 1-3 and 39-41 stand rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Kubota.<sup>1</sup>

<sup>1</sup> The Examiner relies on “known facts” or “obvious” modifications to Kubota in the 35 U.S.C. § 103 rejection of claims 2, 3, 40, and 41 only in the Final Rejection (mailed Nov. 2, 2005), but does not explain what modification to Kubota would render claims 1 and 39 obvious.

Rather than repeat the arguments here, we make reference to the Briefs and the Answer for the respective positions of Appellant and the Examiner.

## ISSUE

The issue is whether the Examiner erred in rejecting the claims under 35 U.S.C. §§ 102(b) and 103(a). The issue specifically turns on whether Kubota anticipates Appellant's claimed invention by disclosing

applying a first threshold adjustment voltage to the second gate electrode when the first gate electrode receives a first control voltage and applying a second threshold adjustment voltage different than the first threshold adjustment voltage to the second gate electrode when the first electrode receives a second control voltage,

as recited in claim 1.

## FINDINGS OF FACT

1. Kubota relates to a thin film transistor having a thin-film channel region which is formed between a conductive electrode and a gate electrode. A constant voltage applied to the conductive electrode shifts the threshold voltage of the channel. (Abstract).

2. As depicted in Figures 1(a) and 1(b) of Kubota, a constant voltage is applied to the conductive electrode 14 placed beneath a polysilicon thin-film layer 12 which acts as the active layer and forms the channel region (col. 12, ll. 25-33).

3. The gate electrode 16 is formed on the channel layer, on the opposite side of the conductive layer 14, and separated by the gate insulating layer 15 (col. 12, ll. 33-35).

4. Kubota shows a graph of gate-source voltage vs. drain-source current characteristics in Figure 4 where two different values of no bias voltage and -20 volts are applied to the conductive electrode. The graph shows the threshold voltage shifted by 2.5 volts by application of the bias voltage to the conductive electrode. (Col. 13, ll. 27-37).

5. Kubota discloses that different constant bias voltages are applied to the conductive electrode for each type of transistors in the buffer circuits 22 and the sampling circuits 23 of Figures 8 and 9 (col. 16, ll. 8-13 and 22-29).

#### PRINCIPLES OF LAW

A rejection for anticipation under section 102 requires that each and every limitation of the claimed invention be disclosed in a single prior art reference. *See In re Paulsen*, 30 F.3d 1475, 1478-79 (Fed. Cir. 1994). “Anticipation of a patent claim requires a finding that the claim at issue ‘reads on’ a prior art reference.” *Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342, 1346 (Fed. Cir. 1999) (quoting *Titanium Metals Corp. of Am. v. Banner*, 778 F.2d 775, 781 (Fed. Cir. 1985)).

#### ANALYSIS

Appellant argues that Kubota applies a constant voltage to the conductive electrode which does not change based upon the application of one of two or more voltages to the gate electrode (App. Br. 9). Appellant asserts that the graph in Figure 4 and the disclosure in column 12 are consistent as to application of a constant voltage of 0 or -20 throughout the

entire range of control voltage applied to the gate or the first electrode (App. Br. 10).

The Examiner argues that claims 1 and 39 do not require applying the two different threshold adjustment voltages during circuit operation (Ans. 5). The Examiner points to the two constant threshold voltages depicted in Figure 4 of Kubota as the applied first and the second threshold adjustment voltages showing a shift of 2.5 V, at the points corresponding to two gate voltages of about 3 V and 6 V where the arrows touch the dashed line and the solid line (Ans. 5-6). The Examiner further argues that the limitation of

for adjusting the threshold voltage by applying a first threshold adjustment voltage to the second gate electrode when the first gate electrode receives a first control voltage and applying a second threshold adjustment voltage different than the first threshold adjustment voltage to the second gate electrode when the first electrode receives a second control voltage

does not limit the claim since such recitation is merely functional (Ans. 7-8).

We disagree with the Examiner's characterization of the claimed limitation as merely "functional languages" and "nonlimiting." As argued by Appellant (Reply Br. 5), claims 1 and 39 should be construed as including means plus function languages which require a means for adjusting the threshold voltage by

applying a first threshold adjustment voltage to the second gate electrode when the first gate electrode receives a first control voltage and applying a second threshold adjustment voltage different than the first threshold adjustment voltage to the second gate electrode when the first electrode receives a second control voltage.

As such, the term “when” in claim 1 indicates a condition for applying the first and the second threshold adjustment voltages in relation with the first and second control voltages applied to the first electrode.

Therefore, we disagree with the Examiner that applying the two bias voltages shown in Figure 4 of Kubota meets the above stated claimed language. We specifically disagree with the Examiner’s reference (Ans. 5) to the 3V and 6V values on the  $V_{gs}$  axis in Figure 4 as the first and the second control voltage corresponding to the first and the second threshold adjustment voltages applied to the conductive electrode since each of the bias voltage values is applied to the conductive electrode for the entire range of  $V_{gs}$  values. Kubota applies a constant voltage to the conductive electrode 14, positioned across from the gate electrode and on the opposite side of the channel layer, for adjusting the threshold voltage of the thin-film transistor (FF 1-3). The threshold voltage shift of 2.5 V in Figure 4 of Kubota is a measure of a general shift in threshold voltage when no bias is compared with a -20 V bias applied to the conductive electrode 14, each to the entire range of  $V_{gs}$  values (FF 4). In other words, in either case of the applied bias voltage, Kubota discloses no change in the threshold adjustment voltage that corresponds to a first or second control voltage applied to the gate electrode 16. The different bias voltages indicated in Kubota are in fact applied to different transistors in the buffer circuit and the sampling circuit according to their required threshold adjustment (FF 5).

## CONCLUSION

On the record before us, we find that Appellant has shown error in the Examiner’s position that Kubota anticipates claim 1 or other independent claim 39 which includes similar limitations. Therefore, in view of our

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analysis above, the 35 U.S.C. § 102 rejection of claims 1-3 and 39-41 as anticipated by Kubota cannot be sustained. Additionally, we do not sustain the 35 U.S.C. § 103 rejection of these claims over Kubota since the Examiner has not identified any modifications to Kubota to overcome the deficiencies discussed above.

#### DECISION

The decision of the Examiner rejecting claims 1-3 and 39-41 is reversed.

#### REVERSED

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